

### ABSTRACT OF THE DISCLOSURE

The present invention discloses an improved transistor with a  $\pi$ -gate structure usable at  
5 microwave and millimeter wave and comprises a GaAs wafer, GND formed on the bottom  
surface of the wafer and grounded to source layers formed on the top surface of the wafer by the  
process of back-side via-hole. A drain is formed on the top surface of the wafer between the  
source layers and has an air layer on top. A gate, shaped as a result of using an air bridge  
technique, contacts the top surface of the wafer between the source layers and the drain so as to  
10 support the wafer at laterally opposite ends over the air layer of the drain. The gate having  $\pi$ -  
structure improves noise characteristics of the transistor because of low electrical resistance,  
which is a result of the gate structure straddling above the drain stage.